

KANSAS INFRASTRUCTURE: STRATEGY FOR FORMULATING
A COMPREHENSIVE "STATE" POLICY

by

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TABLE OF CONTENTS

<u>CHAPTER</u>	<u>Page</u>
I. INTRODUCTION.....	1
Purpose of the Study.....	1
Definition.....	2
Historical Perspective.....	3
II. IMPORTANCE OF STATE'S INFRASTRUCTURE.....	7
Capital Investment of Public Funds.....	7
Life/Safety Issues.....	9
Infrastructure, Economic Development, and Jobs.....	10
III. INFRASTRUCTURE "EXISTING CONDITIONS & PROBLEMS".....	18
Water Systems	20
Sewerage Systems.....	25
Highways, Streets and Roads.....	29
Bridges.....	33
IV. STRATEGIES FOR ADOPTING A COMPREHENSIVE "STATE INFRASTRUCTURE POLICY".....	37
Establishment of an Interdisciplinary "State Infrastructure Task Force".....	37
Formation of a State Infrastructure Office.....	42
Issues the Task Force Should Address.....	44
Research.....	44
Maintenance.....	46
Design Standards/Codes & Regulations....	47

	Page
Education.....	49
Financing.....	50
State Capital Facilities.....	53
V. CONCLUSION.....	54
FOOTNOTES.....	59
BIBLIOGRAPHY.....	69

LIST OF FIGURES

	Page
Figure 1: (1986 Government Expenditures)	8
Figure 2: (Site Selection Constraints)	14
Figure 3: (1984 Maintenance To Be Performed)	19
Figure 4: (1984 Water Treatment Plant Capacity)....	22
Figure 5: (1984 Water-Hours Of Storage Supply).....	23
Figure 6: (1984 Water-Annual Water Loss Rates).....	24
Figure 7: (\$ Of Wastewater Treat. Facilities).....	26
Figure 8: (Leading States in Deficient Bridges)....	35
Figure 9: (1984 Age Of Kansas Bridges).....	36
Figure 10: (1988 Gas Taxes-Midwestern States).....	51
Figure 11: (Monthly Water & Sewer Rates).....	52

CHAPTER I
INTRODUCTION

PURPOSE OF THE STUDY

The quality of a nation's infrastructure is a critical index of its economic vitality. Reliable transportation, clean water, and safe disposal of wastes are basic elements of civilized society and a productive economy. Their absence or failure introduces an intolerable dimension of risk and hardship to everyday life, and a major obstacle to economic growth and competitiveness.¹

Since the early 1980's, several studies and reports have concluded there are serious problems with the nation's infrastructure (e.g. inadequate funding, improper maintenance, poor facility design, etc.). A 1985 Kansas Department of Commerce (formerly Kansas Department of Economic Development, "KDED") research paper, "Kansas Infrastructure", as well as other studies clearly indicate that many of the same national problems also exist in Kansas.² The KDED research paper indicated inadequate funding as a continual problem, improper maintenance was often noted and facilities were many times undersized or oversized in comparison to demand or current design standards. These problems may be costing taxpayers millions of dollars each year as well

as potentially negatively impacting the public's safety and the state's economic development efforts. While individual state agencies have been attempting to address a number of these problems within their jurisdiction, the State has not responded appropriately to looking at the subject in a more comprehensive fashion.

The purpose of this study is to examine recent recommendations of national studies such as the National Council on Public Works Improvements final report, "Fragile Foundations: A Report on America's Public Works" and relate those recommendations to "state" problems highlighted in the KDED research paper and other reports. This study will detail the importance of the state's infrastructure, review existing conditions and problems for major facility components and provide recommendations on a strategy for formulating a comprehensive "state" infrastructure policy for Kansas.³

DEFINITION

The term "infrastructure" has been used to refer to a wide range of public and private facilities that are the physical foundation on which our society and economy rest. These facilities can include but are not limited to: highways, streets, roads, bridges, airports, railroads, mass transit systems, ports, water and wastewater

systems, storm drainage systems, dams and levees, parks and recreational facilities, hospitals, jails, public office buildings, electric, gas, and communication utilities, housing, and solid waste facilities.

Due to the complexity of the subject, most reports on infrastructure have generally limited themselves to reviewing four or five of the most basic components, which have included roads, bridges, water systems and sanitary sewer systems. This report also focuses on these basic components, yet ultimately most capital assets of state and local government should be included in any comprehensive study.⁴ This study's recommendations may also be of relevance towards policy concerning many other components as well. The importance of these other components should not be underrated. The Kansas Corporation Commission is currently wrestling with the problem of deteriorating natural gas pipelines.⁵ The solid waste and hazardous waste disposal issues are also growing and the Kansas Water Office is dealing with a number of water quantity/quality issues.⁶

HISTORICAL PERSPECTIVE

Infrastructure most recently became a popular political subject during the early 1980's, with the release of significant studies, such as Pat Choate and

Susan Walter's 1981 book, "America in Ruins- Beyond the Public Works Pork Barrel." A large number of subsequent reports have helped to propel the topic of infrastructure to national attention, where it has been the subject of public hearings and debate at the federal, state and local levels of government. Many of these studies have had a common theme:

"We have neglected the upkeep of our public improvements, and years of deferred maintenance and inadequate repair are catching up with us. Some facilities have reached, and others are fast approaching, a point of deterioration beyond which repair is impossible--costly replacement or abandonment are the unpalatable alternatives. Without a huge infusion of new dollars to maintain and repair "infrastructure" and to build for the future, our economy will suffer, our quality of life will be eroded, and our standard of living will decline."

These recent national reports on deteriorating infrastructure prompted several state level governmental agencies within Kansas to publish information on various components of the state's infrastructure. These reports were generally very limited in the type of information provided and were normally geared only towards a particular agency's sphere of responsibility and influence.⁸

This author was the principal researcher for a statewide infrastructure study conducted by the Policy Analysis & Research Unit of the Kansas Department of

Economic Development (KDED) during 1984 and 1985. The research paper produced was entitled: Kansas Infrastructure, and it represented one of the State's few efforts to research the infrastructure subject in a comprehensive statewide fashion. Goals, objectives, or policies were not discussed in the report's conclusions. Generally, the report responded to these basic questions considered most important at that time:

1. What is the current condition of facilities?
2. Is deferred maintenance a problem?
3. Does inadequate infrastructure affect the public's health and safety?
4. Does infrastructure affect economic development?
5. Are existing revenue sources and funding levels adequate to meet the needs of infrastructure maintenance, repair, and new construction?

Since the publication of the KDED report, no additional state reports or legislative proposals have been produced which have reviewed the subject in such a comprehensive manner.⁹ However, during the last three years a great deal of information on the subject has been generated at the national level. The Public Works Improvement Act of 1984 (P.L. 98-501) created the National Council on Public Works Improvement. This council has issued a number of reports which have addressed many of the complex issues of infrastructure.¹⁰ These

reports and many other recent works have significantly enhanced federal, state and local policy makers potential knowledge of the infrastructure subject and they form the basis for the recommendations in this report.

CHAPTER II

IMPORTANCE OF STATE'S INFRASTRUCTURE

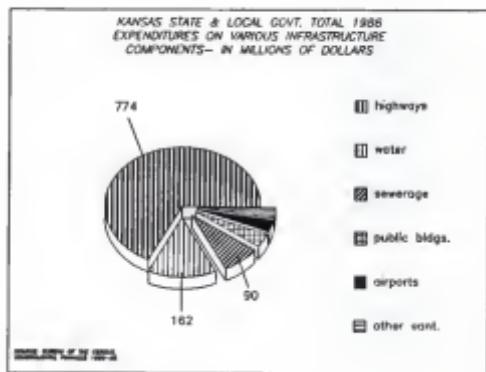
CAPITAL INVESTMENT OF PUBLIC FUNDS

Kansas has over 132,000 miles of public roads, 25,700 bridges (thousands of small culverts), almost 400 Federal Aviation Administration approved airports, nearly 1,100 public water systems with an estimated 35,000 miles of water lines and over 700 wastewater treatment plants with an estimated 10,000 miles of sewer pipe.¹¹ These facilities, as well as the many other publicly-owned infrastructure components represent investments by state and local governments of an estimated 16-20 billion dollars.¹² The private sector in turn has substantial investments and expenditures for items that utilize the state's infrastructure. The private sector's investment in motor vehicles of all kinds is more than twice the public sector's investment in roads and bridges. Further, for every dollar the public sector spends to construct, operate and maintain the roadway network, the private sector spends \$15 to move people and goods.¹³

The following figure illustrates the substantial expenditures incurred by state and local governments in Kansas on highway, water system, sewerage, airports and

sanitation (other than sewerage- e.g. solid waste) components within the state during the 1985-86 budget year.

Figure 1



Well over a billion dollars were spent on just these components, with highway capital spending and maintenance consuming over 774 million (70 percent) of the total. In fact, Kansas ranked seventh in the nation in per capital spending for highways at \$314.72 per capita compared to a national average of \$204.78 per capita.¹⁴

The expenses associated with construction of new facilities, daily operation requirements, annual maintenance needs and upgrading of existing facilities to present standards, all contribute towards the need for increased taxes and user fees. Ensuring the many sys-

tems of infrastructure operate efficiently/effectively and are properly maintained is vital towards keeping taxes and user fees at reasonable levels which in turn can enhance the economic competitiveness of the state.¹⁵

LIFE/SAFETY ISSUES

Every day, every individual in the state must depend on infrastructure components which, if not functioning properly, could adversely affect the health or safety of system users. Many of the infrastructure components have a direct link to the daily health and safety of every person in the state because they provide the very basic necessities of life including drinking water, transportation services, waste disposal, etc. For example, inadequate water treatment facilities can directly affect the health of individuals by lowering the quality of water for drinking purposes. Water facility design can also indirectly affect the safety of individuals, because fire fighters must depend on adequately sized storage and distribution facilities. In turn, wastewater treatment plants and sewer systems protect the health of Kansans by keeping clean the hundreds of rivers, streams and lakes which in many instances are used for drinking water and recreational purposes. Proper street and highway design can directly affect the

safety of motorist. Proper vertical and horizontal alignment, lane widths, shoulder types, shoulder widths, bridge widths, bridge load capacity, etc. can all affect the safe use of streets and roads. For instance the Kansas Interstate System, which is designed to relatively high standards, contains 870 miles, making up less than 1 percent of all public road miles in the state, yet it carries 19 percent of all the vehicular miles of travel in the State and accounts for only 7.2 percent of the accidents statewide.¹⁶ These life/safety issues have not only a human element to them, but a substantial economic element. The direct and indirect economic expense to society can be quite high. For example, national costs associated with traffic accidents and associated injuries and deaths, part of which can be attributed to an inadequately designed road system including highways, local streets, bridges and controls has been estimated to be as high as 80 billion dollars.¹⁷

INFRASTRUCTURE, ECONOMIC DEVELOPMENT, AND JOBS

There are two aspects to the infrastructure - economic development relationship. The effect that infrastructures has on private sector productivity and capital investments and the difference infrastructure

makes in regional economic growth (i.e. jobs).¹⁸

Productivity and capital investments by the private sector can be affected by such things as infrastructure system failure, poor maintenance and inadequate design capacity. System failure can lead to bridge collapses, water-main breaks or other similar disasters which can cause direct and indirect costs for the business community.¹⁹ Improper system maintenance can lead to sewers that are unable to accommodate additional demands because of infiltration and inflow; leaking water mains that lower water system efficiency; and potholed roads that add to the travel time, fuel consumption, and vehicle wear-and-tear. Infrastructure capacity constraints can also affect the productivity of a business or its need to increase capital spending due to roads or bridges being unable to handle additional traffic (increasing cost due to time wasted, increased fuel consumption, additional wear and tear, etc.) or a sewer treatment plant's inability to handle increased loads.²⁰

The authors of "Fragile Foundations: A report on America's Public Works" state that recent studies indicate local public investment and private capital investments are complements. They suggest specific levels of public infrastructure are necessary to support given levels of private investment. While this relationship

may change over time as a result of technological improvements, a balance must be maintained between public and private investment. They go on to say that a sustained high rate of public capital formation tends to increase private-sector capital productivity and hence rates of return and that evidence also suggests that public capital stock may be low relative to the private capital stock.²¹ While increasing spending on public facilities may increase the private sector's productivity, to what extent is not yet fully known.²² Of greater concern to policy makers is what effect does investment in infrastructure have on growth (job creation) at the state, regional or local level.

It is generally accepted that a connection exists between infrastructure and economic growth, but it is difficult to quantify. Growth or economic development within a given area depends on the advantages a location offers; firms seek areas offering greater opportunities for profit. In this context, public works' investments should be thought of as production factors for private firms paid for indirectly through taxes, or directly through user fees. Thus public capital can increase a firm's productivity either by complementing private investment, or by directly contributing to production.²³

There is some empirical evidence that public works

investments do, in fact contribute to the economic growth of regions and states. For example, a recent study found that public expenditures for highways and education help explain differences in the level of economic activity from state to state. However, research has not fully explored the relationship between public investment and private sector performance, particularly with respect to the economic benefits of specific investment projects.²⁴

The Planning Advisory Service (PAS) report "Infrastructure Support for Economic Development" has the following to say about economic growth from the point of view of a locality competing for growth:

"Infrastructure is only one element that goes into determining a community's comparative advantage. The attractiveness of a particular location depends on numerous other factors as well, many of which are beyond the community's power to influence. These include weather, location relative to a firm's markets, local wage rates, and access to specialized labor skills or capital markets. Community infrastructure facilities, together with local tax rates, financing subsidies, and the local business climate are elements that are at least partially under the control of public policy. Studies of firms locations choices indicates that these decisions are most often made sequentially. First, a firm will make a choice about the region or state in which it will do business; then, it will choose an individual community; and, finally, a specific site. There is evidence that infrastructure is a more important consideration in selecting particular sites or communities than in selecting regions or states."²⁵

Figure 2 illustrate the factors considered most important in a 1982 study for selecting a state or region versus final site selection requirements.

Figure 2

CONSTRAINTS ON THE REGION/STATE CHOICE FACTORS VIEWED AS "MUSTS" - ALL INDUSTRIES			CONSTRAINTS ON FINAL SITE SELECTION FACTORS VIEWED AS "MUSTS" - ALL INDUSTRIES		
Factor	Percent of Plant Openings Citing at Least 1 Factor	Percent of Plant Movers Citing at Least 1 Factor	Factor	Percent of Plant Openings Citing at Least 1 Factor	Percent of Plant Movers Citing at Least 1 Factor
Favorable labor climate	76%	34%	Rail service	47%	23%
Near market	35	0	On expressway	42	32
Attractive place for executives/managers to live	39	19	Special provision of utilities (gas, sewerage, water)	34	22
Near supplies, resources (includes energy)	31	28	Rail lines	27	19
Low labor rates	30	19	Environmental permits	23	3
Near existing facilities of domestic company	23	17	Within metropolitan area	21	39
Environmental permits	17	8	On water	16	11
Facility/land already available	5	6	Available land/building	8	11
Better transportation	2	0	Transportation (airport, truck service)	2	3
Taxes, financing	1	0	Community financing support	1	0
Retaining current labor force	0	56	Proximity to other division plant	1	3
Conveniency attitude	0	3	Minimum acreage	1	2
Number of plants citing at least one factor	159	36	Nonresidential use	1	0
Number of plants citing at least one factor			Number of plants citing at least one factor		

Source: Planning Advisory Report # 390 "Infrastructure Support For Economic Development", pages 4 & 5.

It appears that infrastructure is one of the more

important elements that communities or a state can influence for final site selection, yet it does not appear to be a primary concern of the business community in the initial process of selecting a state or region.

The authors of the book "Building Prosperity- Financing Public Infrastructure For Economic Development" have the following to say about infrastructure and economic development:

"The lateness of any state and local government involvement in the majority of business location decisions suggest that the public sector should not place undue emphasis on the potential of speculative investments in infrastructure to stimulate economic development. State and local officials have little input into the business location decision until the site selection process nears completion. A survey of selected economic development professionals underscores the limited applicability of infrastructure assistance to promote economic development. These professionals emphasize the importance of infrastructure to economic development but state that the relationship between the two is indirect. As appears to be the general case with location factors, infrastructure is a factor-- though seldom a controlling one--in the business location decision. Amid the arsenal of potential incentives, its absence may be more crucial than its presence. That is, everything else being equal, the jurisdiction without an infrastructure-related assistance program may be disadvantaged when compared to one that does offer such inducements. By the same token, it appears unlikely that such a policy by itself will offset other impediments to development: 'It is important to keep in mind that, while infrastructure is a necessary ingredient for economic development, it does not guarantee economic growth... infrastructure investment is only one part of the overall management and planning process.' The consid-

erable literature on the importance of various factors that enter into the decisions of firms about the location of facilities, demonstrates little unanimity regarding the relative importance of the factors. Each decision has its own uniqueness.²⁶

As quoted just above, "It is important to keep in mind that, while infrastructure is a necessary ingredient for economic development, it does not guarantee economic growth... infrastructure investment is only one part of the overall management and planning process." States should use caution when advocating improvements to infrastructure to create growth and jobs within a region's economy. A business's locational process involves many factors. A state may spend several hundred million dollars on infrastructure to enhance a region's economy. However, the only major direct benefits may be the short term increased economic activity associated with the actual construction of the facilities. Once completed, employment and economic activity may fall back to preconstruction levels if other locational factors have not been addressed. In other words, from an economic development standpoint, investment in programs that; trains workers in needed skills, aids local governments in helping their communities to become more attractive (livable) places, helps business compete in the world marketplace, or encourages research and investment

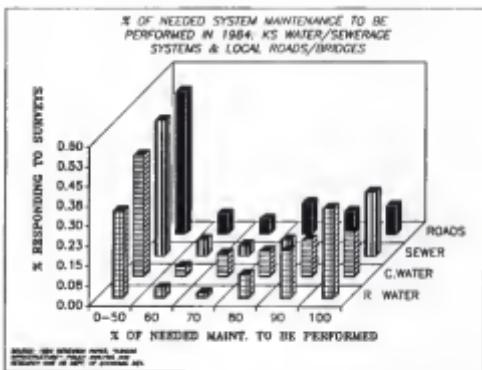
into new technologies, may all have a much greater payback in terms of job retention and creation.²⁷

During the 1970's and 1980's many communities in Kansas constructed industrial parks with complete utilities and good access to state highways (many were constructed with Economic Development Administration Title I public works grant funds). Today, even though the infrastructure has been in place several years, many of these industrial parks are empty or have only one or two businesses because the other locational factors have not been satisfied to induce economic growth.²⁸ Major infrastructure improvements to a region may aid, to some unknown degree, the productivity of existing businesses, by improving existing system deficiencies. However, major infrastructure improvements should not be looked upon as long term job creators in and of themselves.²⁹ Generally, all the locational factors need to be fully addressed before substantial economic growth will occur.

CHAPTER III
INFRASTRUCTURE "EXISTING CONDITIONS & PROBLEMS"

As was mentioned in the introduction of this report, the 1985 KDED infrastructure research paper primarily sought to obtain information concerning the inventory of major components, the condition and problems associated with each component and some idea as to the cost involved in repairing or replacing deficient facilities. Besides a great deal of background research on existing reports, almost 3,000 surveys were mailed to 1,700 local jurisdictions and the response rate accounted for those facilities servicing 80 percent to 85 percent of the state's total population. This surveying was required because information on the inventory and condition of numerous components was incomplete or many cases simply nonexistent. One major finding of this survey effort, though not surprisingly, was the response to a question concerning what percent of needed system maintenance was to be performed during 1984. Figure 3 illustrates that large percentages of system respondents felt they were unable to perform even 50 percent of needed maintenance. Very few respondents indicated they were going to perform 100 percent of needed system maintenance.³⁰ The maintenance of public works facilities is very important because it has a major impact

Figure 3



on the delivery of service, and consumes a significant share of public works expenditures. Perhaps most importantly, deferred maintenance leads to the need for premature rehabilitation, rebuilding, or replacement which can be many times more expensive than providing proper maintenance.³¹ The state's investment in infrastructure, much like one's car, must be properly maintained to realize the full effective life of the facility. Recent discussions with representatives from the Kansas Department of Transportation (KDOT) and Kansas Department of Health and Environment (KDHE) indicate that inadequate maintenance is still a problem in many areas.³²

Except for bridges and the state highway system, little additional data on the condition and problems of component systems has been generated since the 1985 KDED infrastructure research paper. Much of the following information concerning the following major components consists of highlights of the KDED report, the state updates, and national data from recently released reports.

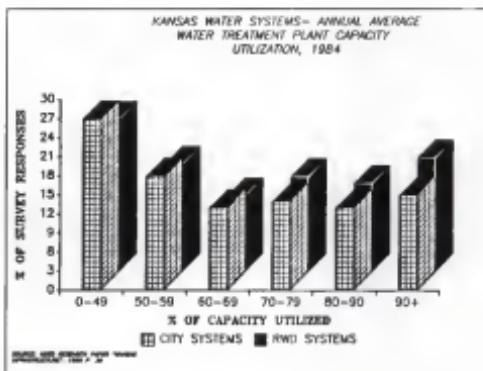
WATER SYSTEMS

Kansas' water system infrastructure is essentially in place with 1085 known public water systems in the state servicing almost 90 percent of the state's year-round housing units. Those not served usually reside in rural areas and rely on private wells. Many of these systems are quite small (50 percent of the respondents to the KDED study had 350 or fewer service connections) and serve only a limited number of customers (e.g. mobile home parks, improvement districts, rest stops, institutions, etc.) The approximately 278 Rural Water Districts (RWD) which provide service to about 70,000 customers, have been replacing many of the county, township, and improvement district systems. Many of the RWD systems were constructed during the 1970's and 1980's. The Kansas Department of Health & Environment (KDHE) is the primary state agency re-

sponsible for administering federal (1974 Safe Drinking Water Act) and state regulations for public water systems.³³

Of the major infrastructure components, water systems receive the fewest federal dollars for system construction. Thus, there are fewer federal requirements for assessing the condition or needs of public water systems. KDHE routinely inspects all public water systems in the state, but does not systematically collect system condition or needs information on a statewide basis. The KDED study found that while the condition and quality of service of most facilities is generally good, problems do exist.³⁴ Many systems currently, or in the near future, face shortages of good quality water, particularly during drought conditions.³⁵ The data available on facility condition indicates that insufficient storage, limited treatment capabilities, and aging leaky distribution systems are problems suffered by a number of water systems. Figure 4 illustrates that many systems may have inadequately sized treatment

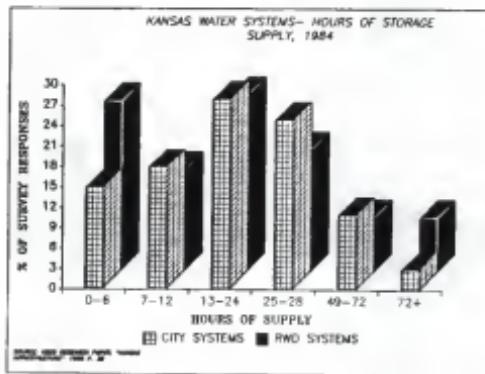
Figure 4



facilities. The utilization rate for treatment capacity is a useful indicator of a community's ability to respond to possible future growth. Generally, those communities utilizing the upper limits of their water plant capacity may not be able to support additional growth without substantial capital outlay. This is particularly true for smaller communities where the excess capacity will, in actual quantitative terms, represent limited treatment abilities.³⁶ Proper storage of supply can improve system pressure and provide a reserve in case of an emergency (pump or power failure). Most systems should have a 24 hour supply of water in their

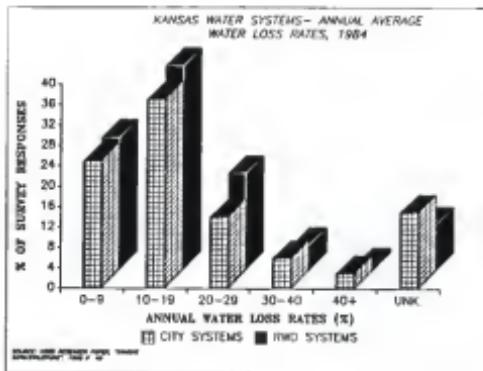
tanks for such needs as fire fighting, etc. During an emergency, anything less than a 24-hour supply (depending on consumption) may affect system pressure and allow contaminated groundwater to leak into the transmission lines, thereby creating a health hazard.³⁷ Figure 5 indicates that over 60 percent of water systems do not

Figure 5



have a 24 hour supply. The KDED study also attempted to assess the condition of water system distribution components by measuring the annual average water loss rate. This is simply the difference between the amount of water purchased or treated compared with the amount of water metered at the point of use. As a rule, water loss rates shouldn't exceed 10-20 percent. Figure 6 indicates

Figure 6



that a substantial number of systems have excessive leakage problems.³⁸ To gather respondent's opinions about water system problems, the KDED survey included the following question, "What is the most critical infrastructure problem of water systems in Kansas today?". The six most frequent responses (in descending order) are presented below.

CITY WATER SYSTEMS

1. Inadeq. sources of water
2. Aging & deterioration
3. Replace existing mains
4. Funding
5. Decline of water table
6. High maint. & matl. cost

RURAL WATER DISTRICTS

1. Inadeq. sources of water
2. Inadequate distribution
3. Funding
4. Improperly sized systems
5. Insufficient storage
6. Poor constr. of systems

The KDED study also attempted to estimate major public water system capital needs. Respondents were asked to list critical water projects that would be needed during the next five years to serve the existing population. The survey identified 684 projects totaling 179 million dollars.

SEWERAGE SYSTEMS

There are over 700 known wastewater treatment plants in Kansas, which provide service to over 80 percent of the state's year-round housing units.³⁹ Those not served usually reside in rural areas and rely on individual septic tanks. Most systems in Kansas are publicly owned and operated.

KDHE routinely inspects all systems in the state. They collect only limited data concerning system condition, but they do collect information for the Environmental Protection Agency's (EPA) wastewater needs survey. Figure 7 illustrates the cost to comply with all 1986 needs for Kansas in comparison to other states in the Midwest. That survey indicates that Kansas would need to spend 367 million (1986) dollars to bring all

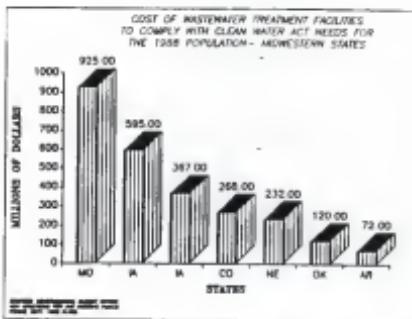
systems into compliance with federal regulations.

Figure 7

The KDED study also attempted to estimate major public sanitary sewer system capital needs.

Survey respondents were asked to list critical sanitary sewer projects that would be needed during the next five years to serve the existing population. The survey identified 311 critical sewer projects totaling almost 237 million dollars.

Systematic data about the condition of sewer systems is limited. Only recent techniques, such as pulling special cameras through the pipe, have enabled system operators to more fully assess the condition of their collection systems. This is an expensive process and only a few systems have completed even partial assessments. However, there are other factors that can be used to gauge a system's condition including: treatment capacity, age, infiltration/inflow (I/I) problems (unwanted entry of groundwater and stormwater), and



maintenance practices. Questions concerning these factors were asked in the KDED survey.

As was mentioned with water systems, the annual average utilization rate for treatment capacity can be a useful indicator of a community's ability to respond to possible future growth. Of the 249 responses, 36 percent of the systems are utilizing at least 80 percent of their capacity. Over 21 percent are utilizing 90 percent of their capacity. At the other extreme, over 19 percent of the systems are operating at less than 50 percent of their capacity.⁴⁰

To estimate the condition of collection systems throughout the state a question concerning sewerage pipe age was included on the KDED survey. Age can be used as an approximate indicator of condition. Generally, pipe 50 years old or older may experience more deterioration than newer pipe (depending on proper initial pipe installation, soil type, proper maintenance, etc.) Of the 8,100 miles of pipe reported from survey respondents, approximately 25 percent was 50 or more years old. Almost 10 percent (800 miles) of pipe was 75 years old or older. However, most pipe (51 percent) is less than 30 years old.⁴¹

As another indicator of collector system condition, the KDED survey also asked if infiltration and inflow

(I/I) was a problem. Half of the respondents indicated that I/I was a problem for their systems. The most frequently cited problem caused by (I/I) was back-ups into residences; 27 percent of the systems cited this as a problem. The second most frequently cited problem caused by I/I is the upset of the biological treatment process at the treatment plant. Other frequent responses were raw sewage overflows into waterways (19 percent) and sewer surcharging (18 percent).

To gauge maintenance practices, the KDED survey also included a question concerning the percentage of the total collection system that is annually cleaned and inspected. By routinely cleaning sewers of blockages and interior surface buildup, the occurrence of sewer back-ups can be reduced. Of those responding to this question, 40 percent reported they annually clean and inspect 25 percent or more of their collection system. Thirty-four percent of the respondents indicated they cleaned and inspected less than 10 percent of their system, while 6 percent indicated they were performing no regular maintenance.⁴²

To gather respondent's opinions about sanitary sewerage problems, the KDED survey included the following question, "What is the most critical infrastructure problem of sanitary sewer systems in Kansas today?".

The six most frequent responses (in descending order) are noted on the next page.

SEWERAGE SYSTEMS

1. General aging and wear on sewer system
2. Replacement of sewer mains
3. Infiltration/inflow- leaking collection systems
4. Funding
5. Systems not sized properly
6. Not performing needed maintenance

HIGHWAYS, STREETS & ROADS

The state of Kansas has a total of 132,641 miles of public roads. The State Highway System, which is maintained by the Kansas Department of Transportation (KDOT) is 9,639 miles long. Counties, Cities, and Townships are responsible for maintaining the remaining mileage. Kansas is near the middle of all states in miles under state jurisdiction, but we have the 5th largest system of public roads in the nation; Texas, California, Illinois and Minnesota all have greater public road mileage.⁴³

During 1987, there were more than 31 million daily vehicle miles traveled on the State Highway System. This figure represents almost 56 percent of all the daily vehicle miles driven in the State of Kansas, even though the State Highway System comprises only 7 percent of the public road miles in the State.⁴⁴

Road condition is based on several criteria. The

general public is most aware of the surface (pavement) condition. However, there are other elements in determining roadway deficiencies, including lane width, shoulder type and width, vertical and horizontal alignment (grades and curves), and service/congestion problems. Criteria is based on standards developed by the American Association of State Highway and Transportation Officials (AASHTO). These standards vary by the functional classification of the roadway and its traffic volume. Many roads were designed according to standards for traffic 40 years ago, but are not adequate for current traffic (increased weight and size of the vehicle). Many roads are narrow, poorly aligned, and lack proper shoulders. Technically, roads with these types of deficiencies are in unsatisfactory condition.⁴⁵

Information on the pavement condition of the state highway system is good. KDOT maintains the Highway Performance Monitoring System (HPMS), which includes information on quantity and usage of roads as well as qualitative information describing each segment of the State Highway System, including pavement types and condition, location and extent of curves and grades and width, and type of shoulders.

The condition of the State Highway System in Kansas needs substantial improvements. According to a 1983

federal report, "The Status of the Nation's Highways" (which was derived from HPMS data), Kansas was near the top among states for the greatest percentage of Interstate mileage in fair or poor condition. Pavement condition on arterial road systems (which are also part of the State Highway Systems) was almost as bad.⁴⁶ More recent HPMS data suggests that while some improvements have occurred, the backlog of needed projects is quite high. A 1988 KDOT needs study indicates that 2,300 miles of the system require reconstruction or heavy rehabilitation and approximately 7,300 miles which need to be overlayed.⁴⁷

KDOT has also noted a number of other system deficiencies with the State Highway System including; the need to widen (lane width) over 1,000 miles of the system, to increase the shoulder width on 2,075 miles, to add full width pavement shoulders to 160 miles and composite shoulders to 5,100 miles, to modify vertical alignment on 410 miles, and to provide relief to congested areas on almost 200 miles of road.⁴⁸ Of these needs KDOT considers the pavement condition as most critical because they are unable to keep up with maintenance and replacement.

KDOT has not yet supplied dollar figures for its latest needs study, however they did estimate cost for

the KDED study. 1985-2004 State Highway System needs were estimated to cost 4.5 to 8.9 billion dollars. Assuming past funding trends would remain similar, they estimated funding shortfalls of 1.94 to 5.84 billion dollars.⁴⁹

Information on the condition of local roads is very limited. Data from the 1983 federal report, "The Status of the Nation's Highways" indicated that pavement conditions for collector roads (which are primarily maintained by county governments) were also quite poor. More recent HPMS data also indicates that while some improvements have occurred, the backlog of needed projects is still quite high. Information on other roadway deficiencies, including lane width, shoulder type and width, vertical and horizontal alignment (grades and curves), and service/congestion problems is virtually nonexistent. However, additional information on local road conditions was obtained through 1984 surveys conducted by KDED. Substantial amounts of backlog work for overlaying, sealcoating, and regraveling were noted.⁵⁰ KDED also asked respondents of the street and road survey to list critical projects needed over the next five years. Respondents identified 450 million dollars worth of critical projects. To gather respondent's opinions about critical street and road infrastructure problems,

the KDED survey also included the following question, "What is the most critical infrastructure problem of streets and roads in Kansas today?". The six most frequent responses (in descending order) are noted below.

<u>COUNTY SYSTEMS</u>	<u>CITY SYSTEMS</u>
1. Bridges & culverts	1. Funding
2. Funding	2. Inadequate maintenance
3. Heavy loads & more vech.	3. Aging & deterioration
4. General aging of roads	4. Bridges
5. Cost of proper mainten.	5. Loads, speed & # of vech.

TOWNSHIP SYSTEMS

1. Not able to perform proper maintenance
2. Culverts and bridges
3. Funding
4. Cost of materials
5. Potholes
6. Heavy loads, higher speeds and greater # of vehicles

BRIDGES

The Federal Highway Administration (FHWA) and Kansas statutes (K.S.A. 68-1101) generally define a bridge as a structure having a clear span (length) of more than 20 feet. In Kansas structures of less than 20 feet in length are usually referred to as culverts.⁵¹ KDOT is also the primary state agency responsible for administering Federal and State programs/regulations for bridges.

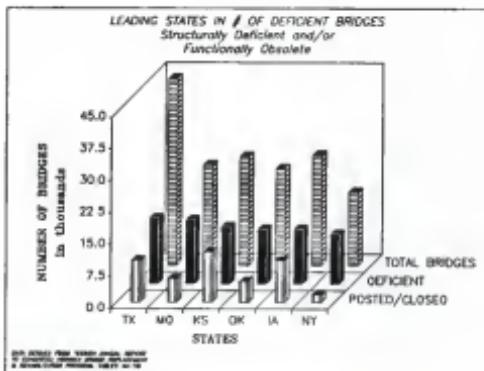
Kansas currently has 25,700 bridges throughout the State (4th in the nation for total number of bridges).

More than 75 percent of these bridges are maintained by Counties, 18 percent by KDOT and the remainder by cities and the Kansas Turnpike Authority.⁵²

Compared with other infrastructure components, the condition information for bridges is excellent. The Federal-Aid Highway Act of 1968 established a National Bridge Inspection Program (NBIP). Generally, the bridge program requires states and/or local governments to inspect their bridges every two years, in accordance with national bridge inspection standards. In addition, each state is responsible for maintaining an accurate and current inventory of bridges and submitting specified inventory data (including inspection results) to the FHWA for its national bridge inventory. Ratings are established from this inspection program to arrive at measures of structurally deficient and functionally obsolete bridges. A structurally deficient bridge, as defined by the FHWA, is one that (1) has been restricted to light vehicles only, (2) is closed, or (3) requires immediate rehabilitation to remain open. A functionally obsolete bridge is one on which the deck geometry, structural condition, clearance, or approach roadway alignment no longer meets the criteria for the system. According to the 1987 Eighth Annual Bridge Report to Congress, Kansas has 5,726 structurally deficient

bridges and 7,703 functionally obsolete bridges. Thus over 52 percent of all bridges are either structurally deficient or functionally obsolete. Figure 8 indicates that Kansas is 3rd in the nation in the total number of deficient bridges. Among states, Kansas leads the nation with the greatest number of closed and posted (and open but should be posted) bridges.⁵³ These mostly

Figure 8

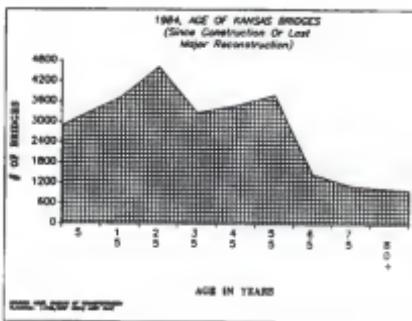


rural bridges affect safety, as well as the productivity of a region. In addition to FHWA's interpretation of structurally deficient and functionally obsolete bridges, age can also be used as a general indicator of condition.⁵⁴ The typical bridge is designed to last about 50 years.⁵⁵ According to the KDED study, the

average age of all bridges in Kansas since construction or last major reconstruction is 36.3 years. Figure 9 illustrates, the age of Kansas' bridges since they were built or last reconstructed. Almost 30 percent of the bridges have already exceeded their life expectancy and 43 percent are 40 years old or older (near the end of expected usefulness).⁵⁶

Figure 9

In conjunction with the KDED study, KDOT developed a method for estimating the cost of repairing the functionally ob-



solete and structurally deficient bridges in Kansas. In 1984 dollars they estimated it would cost 2.1 billion dollars to repair all deficient bridges. It was also estimated that only \$70 to \$80 million was spent for capital outlays on bridges during 1984.⁵⁷

CHAPTER IV

STRATEGIES FOR ADOPTING A COMPREHENSIVE "STATE" INFRASTRUCTURE POLICY

ESTABLISHMENT OF AN INTERDISCIPLINARY "STATE INFRASTRUCTURE TASK FORCE"

The adoption of any policy in a democracy involves a political process that many times requires a series of compromises between what is initially proposed and what is finally adopted. Certainly, the 1987 special session by the Kansas Legislature on the adoption of a comprehensive statewide highway improvement plan was an excellent example of this political process in action. The Governor had stressed the need for quick adoption of a comprehensive roads program and indeed called for the special session to review and approve the proposal. However, a major political problem occurred with the use of a 19-member task force which developed the Governor's \$1.7 billion plan. Many of its members were from regions where many of the highway improvements were proposed. The perception (real or not) was the proposed highway improvement plan was a "pork barrel", full of special projects that weren't really needed. Politicians in many areas (particularly larger urban areas) saw the plan as a means to tax the more densely populated areas in order to construct roads in rural,

less populated areas.⁵⁸ Instead of the adoption of policies that addressed the numerous street/bridge problems in the state, the special session ended with no policies being adopted. At this time, new programs have already been proposed for the 1989 legislative session.⁵⁹

While the Governor's task force concept was a worthwhile one, the composition of its members and its field of study should have been broadened. As noted in Chapter Two, the state's infrastructure represents a tremendous capital investment which is of great importance to not only the economy but the everyday health and safety of all Kansans. Chapter Three highlighted just some of the problems associated with the major components. A task force should be reviewing not just the state's highway/road system, but other infrastructure components as well.⁶⁰ Generally, a "State Infrastructure Task Force" should be primarily concerned with public capital facilities of the State as well as local governments.⁶¹ These could include such components as; highways, streets and roads, mass transit systems, water supply and distribution systems, sanitary sewerage systems, storm drainage systems (including flood control), aviation facilities, solid and hazardous waste facilities, and public buildings of all types.

A "State Infrastructure Task Force's" primary goals and objectives should be to review existing information on each component, including: quantifying the number and condition of facilities, reviewing problems and needs of the various components, and addressing the numerous funding and economic development issues (see section "Issues The Task Force Should Review"), Most importantly, the task force should ultimately present an analysis of public policy options and recommend strategies for action to the Governor and legislature.⁶² These recommendations should primarily be concerned with defining the State's role in each infrastructure component, particularly with respect as to what type of programs (assistance) are needed (if any) to address noted concerns and problems. Recommended programs should adequately address the needs of urban and rural areas as well as distinguish between state owned and operated facilities versus local government owned and operated facilities.

The membership composition of the "State Infrastructure Task Force" must be interdisciplinary in nature. Each component to be studied should be assigned a task member(s) who is very knowledgeable about the subject matter. Appropriate task force members could include but are not limited to: officials from State

agencies (KDOT, KDHE, KDOC, KWA, etc.), representatives (elected or staff) from federal, regional, state or local units of government (city, county, townships, FMHA, MARC, etc.), members of various professional organizations (Kansas Contractors Association, Kansas Engineering Society, Kansas Consulting Engineers, League of Municipalities, Kansas Rural Water Association, American Public Works Association, etc.), Chamber of Commerce representatives, respected professionals from the private sector (economists, engineers, planners, financial experts, managers, consultants, etc.), college professors, or any interested citizen. In order to alleviate previously mentioned concerns with the Governor's highway task force, the makeup of the task force members (male/female, urban/rural, regional differences, etc.) should be representative of the general population as well as to the nature of the major infrastructure components.⁶³

"State Infrastructure Task Force" members could be appointed by the Governor with the legislature retaining the right to veto specific individuals. Another possible technique would be for the legislature and Governor to jointly appoint task force members. In either instance, some care must also be exercised to ensure that potential task force members do not have a conflict

of interest with serving on the task force. The task force should be comprised of no more than 15 - 20 persons. The basic objectives of the task force should be completed within 18 to 24 months at which time it could be disbanded or retained on an ongoing basis.⁶⁴

The need to comprehensively review the subject of infrastructure and formulate policies is important. Concerns about which technique should be utilized to derive policy should not stand in the way of completing a study that contains recommendations for action. Other non-task force techniques for reviewing the subject might work equally as well. A state inter-agency committee approach would be one technique as would the hiring of consultants to complete a statewide study. However, the use of the task force concept to derive state infrastructure policy offers several advantages. First, and perhaps most important, is that recommendations from a broad based task force membership may be more acceptable politically. This can occur because the membership is more representative of the general population (and various interested organizations) and those members have a hand in the recommendations from the ground up. This is a very important in an interdisciplinary subject such as infrastructure. A second advantage to the task force concept is that policy is not derived in an "ivory white

tower". The diverse backgrounds of each task force member can assist in more fully understanding the true problems confronting specific infrastructure components and deriving recommendations that are effective in the real world.

FORMATION OF A STATE INFRASTRUCTURE OFFICE

In order to provide assistance to the "State Infrastructure Task Force", funding for a state infrastructure office should be established by the legislature. Initial funding levels should be high enough to hire three or four staff members for an 18 to 24 month period and to pay for other related office expenses. Generalists (perhaps a planning background) who are knowledgeable about the complexities of the infrastructure subject and technical specialists (perhaps an engineering background) would be acceptable. Secretarial help would also be needed.

The office and staff would be established several months before the task force was formed. This would allow staff time to organize and complete needed background research.

Administratively speaking the office could be located in any one of a number of different state agencies. The Department of Administration might be a good

location because many of the task force's recommendations may relate to capital budgeting and financing of facilities. The Governor's office might also be another possible location because of the interdisciplinary nature of the subject and the need to coordinate between agencies. Because the state's infrastructure can have significant impacts on the economy, the office could also be located within the Department of Commerce. Regardless, the initial location could be on a temporary basis. The office's long term functions and the best location, within State government, should be decided by the task force in conjunction with their recommendations to the Governor and legislature.⁶⁵

The office's initial goals would be to provide direct assistance in helping task force members research various infrastructure issues as well as aid in formulating the task force's recommendations. The office would also be valuable in coordinating the various governmental agencies and organizations which have responsibility for the numerous infrastructure components.

The following specific issues (among others) should be reviewed by the task force in formulating their recommendations concerning infrastructure and the function of the state infrastructure office.

ISSUES THE TASK FORCE SHOULD ADDRESS

The following issues were often brought up in recent national reports on the subject of infrastructure. These reports include: "Fragile Foundations: A Report On America's Public Works", final report to the President, by the National Council On Public Works Improvements, "New Directions for the Nations Public Works", by the Congressional Budget Office, and numerous other research papers.⁶⁶ Specifically the task force should review these and other issues before formulating recommendations concerning the state's infrastructure. Recommendations should relate not only to the problems of state owned and operated facilities, but also of those facilities owned and operated by the many local units of government. As was mentioned previously consideration should also be given to differences between rural area needs versus urban area needs.

RESEARCH

The subject of research can be broken down into many different categories, including the need to undertake research for new products and technologies, management/personnel issues, reviewing codes and standards, reviewing new financing techniques, and the numerous social/economic issues including the economic

development/infrastructure relationship.⁶⁷

Over the past 15 years, the nation has seen rapid innovation in many fields, such as medicine, communications, and biotechnology. However the pace of discovery and technological breakthroughs for public works has been much slower and less dramatic due in part to the limited amount of research and development.⁶⁸ The potential for cost savings through new construction/maintenance techniques and improved management can be quite dramatic. In-place relining of water and sewer pipes, low-cost and effective biological waste treatment systems, office-automation systems including computer aided design and geo-based mapping, acoustic emmission inspection of bridges, new high-tech materials for replacement parts, pavement management and recycling technologies, cathodic protection systems and ice detection sensors for bridges are just a few of the technologies that can reduce cost and yet enhance the long term performance of facilities and the services they provide.⁶⁹

Federal statistics indicate the private sector spends approximately 4.2 percent of its total sales for research and development.⁷⁰ In comparison, available data suggests little state funding is going towards technological research in the infrastructure field, or

for that matter other fields as well. Belden H. Daniels, a former consultant for the state's economic development program recently said, "If we do not innovate, we are not going to survive -- We are going to get much poorer, much faster. It is technological innovation that is the driving force of the future of every one of us".⁷¹

To improve the performance and reduce the cost of infrastructure, the task force should study the feasibility of a state grant program designed to stimulate infrastructure related research on; new products and technologies, management/personnel issues, reviewing codes and standards, reviewing new financing techniques, and the numerous social/economic issues including the economic development/infrastructure relationship.⁷²

MAINTENANCE

The transition from an era of construction to one of maintenance, rehabilitation, and replacement is evident in almost all infrastructure components.⁷³ However, as was seen in the previous chapter, one of the most disturbing problem areas is the lack of adequate maintenance on existing facilities. This lack of maintenance is needlessly adding substantial long term cost to system users (taxpayers) through costly facility

failures and shorter facility lives.⁷⁴

There are many reasons for this lack of maintenance, including inadequate funding, lack of maintenance research, ineffective management, etc. Another problem is that maintenance work does not have the high visibility that new projects receive. The comptroller for the State of New York recently noted,

"When highways and bridges are regularly maintained there is no press coverage. When they are rebuilt it is an 'event'. There is a ribbon-cutting and plenty of press coverage. The incentives, therefore, are for public officials to purposefully starve the maintenance budget...Until this motivation...is acted upon, we will be treated to recurrent infrastructure crises."⁷⁵

Major cost savings can be realized if existing facilities are properly maintained. The task force needs to clearly review maintenance practices for all components and stress recommendations which address the practices of deferring maintenance.

DESIGN STANDARDS/CODES AND REGULATIONS

As was noted in previous chapters, Kansas is a national leader in the total number of infrastructure facilities including miles of roads, number of bridges, number of dams, miles of railroads, etc. While this may be a fact for some to be proud of, we are also unable to properly maintain and replace many of those facilities.

Thought needs to be given to the cost-effectiveness of component systems designed to standards which may be unreasonable economically. For example, does the state highway system really need to be almost 10,000 miles long? Does the local road system really need to contain the number of miles and bridges that is does?⁷⁶

The cost-effectiveness of design standards for individual facilities is also open to debate.⁷⁷ For example, many of the state's deficient bridges are deficient only because they do not comply with more recently adopted design standards which require greater widths and load carrying capabilities. In reality, many of these bridges, which are located in lightly traveled rural areas, function quite well at serving local traffic. These same types of standards as well as many other government regulations (many of which are requirements of federal, state and local governments), can substantially affect the new construction and rehabilitation costs associated with every component.⁷⁸ Standards and other regulations cannot be formed in a vacuum. Consideration must be given to the benefit derived and the cost associated with the standard or regulation.⁷⁹

The issues raised are very complex. The task force should carefully review the subject of standards as well as government regulations (including state

statute requirements) in formulating any recommendations.

EDUCATION

Education is a key component to any federal, state, or local infrastructure program.⁸⁰ Educating the general public about the state's infrastructure will lead to greater understanding of the subject and thus more informed decision making by the voters. The lay person has little understanding of the basic systems that allow them to; drink clean water with the turn of a handle, hop in their car and drive to the airport, catch a plane and fly for hundreds of miles to another airport, dispose of human waste with the single flush of a toilet, leave solid waste in a plastic bag at the street curb, or utilize the numerous public buildings. To date, few education programs for the general public have been undertaken at the state or local levels. In turn, education is also vital in terms of information dissemination to public works managers. New products, technologies and management techniques are not useful if they are not conveyed to the persons and institutions who can use them.⁸¹

The task force should more extensively review the effects of educational programs for the general public as well as information dissemination to public works

managers. New programs and/or improvements to existing ones may be warranted to aid information that is available to the state's public works managers. The cost/effectiveness of a long term general public education campaign should be reviewed.⁸²

FINANCING

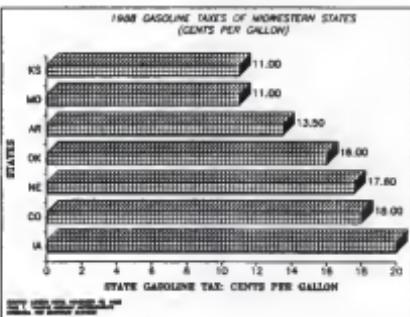
The authors of "Fragile Foundations: A report on America's Public Works", suggest that a new commitment, shared by all levels of government, the private sector and the public could require an increase of up to 100 percent in the amount of capital the nation invests each year in new and existing infrastructure facilities.⁸³ Who should pay for these improvements and the methods to finance them are the central issues of infrastructure financing.

Several different studies suggest that those individuals and businesses that use infrastructure should be the ones who pay for needed improvements. Major portions of the state's infrastructure, such as transportation, water supply, wastewater treatment and solid and hazardous waste systems can utilize user fees as a revenue source since they often times serve identifiable customers, their use can be measured and priced; those who refuse to pay can be refused services.⁸⁴

Kansans already pay a number of user fees including their water and sewer bills as well as a state gasoline tax.

Figure 10

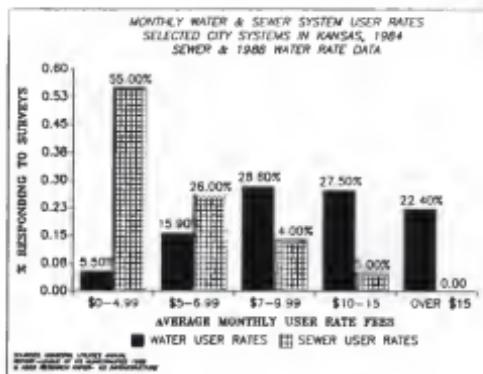
Figure 10 illustrates the current cents per gallon, gasoline tax in Kansas compared to other adjacent states.



Kansas has one of the lowest taxes in the region. This lower user fee is compounded by the problem of more vehicle miles driven yet fewer gallons of fuel consumed due to increases in the fuel economy of newer vehicles.⁸⁵

Figure 11 illustrates recent monthly charges for water and sanitary sewer service in the state. This graph reflects that many user fees are quite low particularly for sanitary sewer systems. Certainly the task force should further explore the concept of utilizing user fees for a wide variety of state and local component systems. Other existing or proposed alternative state funding mechanisms should also take into account the use of user fees in their loan or grant approval

Figure 11



process. Currently, the major alternative funding mechanisms include the Community Development Block Grant program (KDOC), the Kansas Development Finance Authority (KDFA), the Water Pollution Control Facility loan program (KDHE), and the Kansas Partnership Fund Act. The task force should research these programs to determine (among other items) if funding levels need to be modified or if programs need to be consolidated and streamlined for greater efficiency and effectiveness.

The task force must also research the many other infrastructure financing issues facing the state, including privatization, capital improvements programming, alternative funding mechanisms (impact fees, new forms of

debt financing, etc.), social implications of various policies, state statute limitations, adequacy of funding levels to provide proper maintenance and operations funding, etc.⁸⁶

STATE CAPITAL FACILITIES

Kansas State government spends well over \$300 million annually, on capital improvements, debt service, and the acquisition of capital equipment. However it appears that the existing capital budgeting process, which assures the capital assets of the state are well tended, that capital investments are well planned and budgeted, and that state debts are well managed can be improved upon. The infrastructure task force should review current capital budgeting practices of the state and provide recommendations for improvements. The feasibility of creating an independent agency with authority and expertise for reviewing capital plans and budgets and for overseeing the capital assets of the state should also be explored.⁸⁷ The possibility of incorporating other local government infrastructure assistance programs into this agency should also be examined.

CHAPTER V
CONCLUSION

Understanding the system of state infrastructure components is important because these systems represent a substantial financial investment, which not only support the state's economy but also protect the health, safety, and welfare of all Kansans.

To date state government policy makers have taken only piecemeal approaches to understanding existing and potential future infrastructure problems. Inadequately designed facilities, deferred maintenance, and inadequate financing, appear to be just a few of the many legitimate problems facing those state and local government component systems studied.

Legislation on infrastructure has been piecemeal as well, with action on specific problems (usually financing) applied towards specific components versus systems of components. For example, the latest infrastructure legislation to be approved, the Kansas Partnership Fund Act, is primarily aimed at providing financing for local projects which can aid the state's economic development efforts. While this is certainly an important cause, it does not address the many other issues such as; the need for research, improving management/operator training, upgrading maintenance practices, or reviewing other

alternative financing mechanisms.

The lack of a comprehensive policy could be costing taxpayers millions of dollars and may be negatively affecting the state's economy. Additional research could yield new products or techniques which could save millions of dollars by extending the service life of facilities and thus reducing the need to increase user fees or taxes. Limiting user fee or tax increases (by increasing the efficiency in which infrastructure components are constructed and maintained), can increase disposable income for consumers which in turn can stimulate the local and state economy. Evidence also suggests that inadequate infrastructure can increase the business communities cost of conducting business in the state (e.g. increasing transportation cost do to poor road conditions) as well as affect the final site selection decision for new businesses.

The establishment of a "State Infrastructure Task Force", utilization of a state inter-agency committee or use of consultants are just a few of the many ways of researching the infrastructure subject and deriving policy recommendations. However, the use of a broad based task force, whose membership would be approved by both the legislature and Governor, may derive more politically acceptable recommendations which are effective

in the real world. If a task force is utilized a state infrastructure office should be funded to research the subject and provide assistance to task force members. The office could initially be located within the Department of Administration or even the Governor's office with its final location being determined by the task force.

In order to adequately derive state policies, task force members and the state infrastructure office staff should study numerous infrastructure related issues including: why existing facilities are not be properly maintained; the lack of research for new products and construction/maintenance techniques; the need to continually review design standards and other government regulations to ensure their appropriateness with regards to costs incurred and benefits derived; the need to provide improved management/operator training and maximize public awareness through increased educational programs, the need to review the many financing issues including; user fees, innovative financing mechanisms (new forms of debt financing, impact fees, etc.), capital budgeting, and the role of state assistance programs, etc.

Researching the previous issues thoroughly is vital because solutions to the state's infrastructure problems may often times be multifaceted and interrelated.

Spending more money for new construction or maintenance may often times appear to be a solution. But the question should be, on what specific programs should the funds be spent? For example, the root causes of deferred maintenance may be not only a lack of proper financing (and financing mechanisms) but; inadequately trained management, regulations/legal requirements which skew the proper investment decision, improper education of the general public, lack of new technologies, etc.

As also indicated by the National Council on Public Works final report, Fragile Foundations, the solutions to many of the existing problems do not lie in just spending more money on maintenance/construction of facilities. A much bigger return on the investment dollar may be realized by addressing the many small issues (technological, educational, etc.) which affect the state's infrastructure.

In addition, the task force's recommended programs of action must distinguish between state owned and operated facilities and local government facilities as well as satisfactorily address the urban versus rural needs of the state?

Whether the task force, inter-agency committee or consultant approach is utilized, ultimately a thorough review of the previous issues must be completed and an

analysis of public policy options and recommended strategies for action must be presented to the Governor and legislature.

FOOTNOTES

- (1) Fragile Foundations: A Report on America's Public Works- Final Report to the President and Congress, by Joseph M. Giflio, Chairman of the National Council on Public Works Improvements, (U.S. Government Printing Office, Washington D.C., 1988), 1.
- (2) Kansas Department of Economic Development. Policy Analysis & Research Unit, Research Paper - Kansas Infrastructure. (Topeka; KS 1986). i-vii. Additional national reports to refer to include: Kansas Department of Transportation. "Report of Highway Needs." (August 22, 1988). Department of Transportation: Office of Engineering Bridge Division. "Eighth Annual Report to Congress: Highway Bridge Replacement and Rehabilitation Program." (1987) and the EPA's 1986 Needs Survey for sewerage projects.
- (3) There are several national reports that have been produced lately, most of which related to the National Council On Public Works Improvement efforts. See also, Congressional Budget Office. New Directions for the Nation's Public Works. (Washington, D.C.: Government Printing Office, September 1988).
- (4) While the government should and does regulate the private sectors infrastructure components, it should not review those components in as much detail, other than for concerns for safety or effects on the economy. On the other hand all capital assets of state and local government (major components might include public buildings, electric/gas utilities, local roads and bridges, etc.) should receive more thorough review, because of the capital investment and maintenance responsibilities.
- (5) Randell Beck and James A. Fussell, "KPL Survey Finding Many Hazards," The Kansas City Star, November 27, 1988, 1(A) and 14(A). KPL officials noted that one of every 25 residential service lines inspected recently had a leak, of which 25% were considered hazardous.

- (6) The National Council On Public Works Improvements final report Fragile Foundations, 6, gave the Nation a grade of C- on Solid Waste and a D on Hazardous Waste.
- (7) KDED, Kansas Infrastructure, i.
- (8) There were selected reports published by KDOT and others concerning highway and bridge, railroad, as well as sewerage needs. Legislative Interim Committees also reviewed the infrastructure subject in 1983.
- (9) The Legislative Joint Committee on Economic Development researched the infrastructure subject during 1987 and in fact legislation was eventually proposed and approved. A major highway plan was also proposed, reviewed and denied, during a special legislative session held during the summer/fall of 1987.
- (10) Joseph M. Giflio, Chairman of the National Council on Public Works Improvements, Fragile Foundations (Washington D.C. 1988), 205-208.
- (11) The road and bridge numbers were obtained from; Kansas Department of Transportation. "Report of Highway Needs." Topeka, KS, August 22, 1988, 1. The remaining figures were found or derived from the KDED, Kansas Infrastructure study pp. ii-vi. At that time Kansas also was third in the nation in number of miles of rail line (7,117 miles) and second in the nation in the number of dams (5,000). It should be noted the miles of water and sewer lines are only rough estimates derived from the KDED surveys (applying average miles of pipe to those systems that did not respond) The point is the number of miles of lines are quite substantial and represent a large investment
- (12) Flentje, H. Edward. Kansas Policy Choices; Kansas Special Commission on a Public Agenda. 1986, 137. This study indicated total investments might be worth 16 billion dollars. Investments since that time have probably pushed that figure much higher. Information from the U.S. Department of Commerce, Bureau of the Census, Government Finances in 1985-86, Washington, D.C., 1987, 63 estimates that the total capital outlays for fiscal

year 1986 to be \$818 million. Regardless of the actual amount the figures are quite high and represent a tremendous investment that must be protected.

(13) The National Council On Public Works Improvements Final Report Fragile Foundations, 132. Page 150 indicates the private to public spending ratio for airports is 9 to 1.

(14) U.S. Department of Commerce, Bureau of the Census, Government Finances in 1985-86, 109.

(15) If the infrastructure in Kansas is better managed and maintained, overall costs might be lower for the same services provided in comparison to other states. This helps keep taxes and user fees lower which is attractive to businesses and individuals in itself. However, that income saved (which might be otherwise spent on an inefficient infrastructure system) can have a positive effect on the economy when it is spent on other goods and services.

(16) Kansas Department of Transportation. "Report of Highway Needs." 1988, 1. The accident percentage rate was obtained from a November 29, 1988 telephone conversation with Dean Landman, Systems Plan Engineer, Division of Planning and Development, KDOT, Topeka, KS.

(17) U.S. Department of Commerce. Statistical Abstract of the United States, 108 ed, Washington, D.C.: 1988, 579.

(18) The National Council On Public Works Improvements Final Report, Fragile Foundations, 35.

(19) Rita J. Bamberger, William A. Blazar, George E. Peterson. Infrastructure Support for Economic Development. American Planning Association Planning Advisory Service Report No. 390, 7.

(20) Ibid., 11.

(21) The National Council On Public Works Improvements Final Report, Fragile Foundations, 35-36.

(22) Ibid. For additional information on the relationship of productivity and infrastructure see: Alan S. Blinder, "Are Crumbling Highways Giving Product-

tivity a Flat?" Business Week. (August 29, 1988): 16. and Theodore E. Keeler, "Public Policy and Productivity in the Trucking Industry: Some Evidence on the Effects of Highway Investments, Deregulations, and the 55 MPH Speed Limit." American Economic Review 76 (May 1986): 153-158. and Peter J. Mackie, and David Simon. "Do Road Projects Benefit Industry?: A Case Study of the Humber Bridge." Journal of Transport Economics and Policy 20 (September 1986): 377-384. McManamy, Rob and Tim Grogan II. "Study Links Productivity Sag to Neglect of Infrastructure". Federal Reserve Bank of Chicago Study. September 1, 1988.

(23) The National Council On Public Works Improvements Final Report, Fragile Foundations, 35.

(24) Ibid., 35-36.

(25) Rita J. Bamberger, William A. Blazar, George E. Peterson. Infrastructure Support for Economic Development, 4.

(26) U.S. Government Finance Research Center of the Municipal Finance Officers Association. Building Prosperity: Financing Public Infrastructure for Economic Development. (1983), 81-82.

(27) Scott R. Fosler, "State Economic Development Strategies." Economic Development Review 6 (winter 1988); 45-49. (E.A Mosher). "Public Tools of Kansas Cities for Private Economic Development." Kansas Government Journal, December 1983, 348-349. Anthony Redwood, "Job Creation in Nonmetropolitan Communities." Journal of State Government 61 (January/February 1988): 9-15. Local governments can also have a dramatic effect. For example, the City of Lenexa, KS has seen very rapid rates of growth in new businesses locating within the City over the last several years. While admitting that the infrastructure is essentially in place, one of the primary reasons cited for locating in the City is the quality of living in Lenexa. High standards (building materials, signage, landscaping, setbacks, etc.) that are enforced, have helped create a unique environment which the business community finds desirable.

(28) No attempt was made to review any statistical studies which may have been completed concerning the

construction of industrial parks and economic growth. However, a telephone conversation with Dave Bossemeyer, Kansas Department of Commerce indicated there are a number of communities with fully serviced industrial parks that have seen little new economic growth since the industrial parks were constructed.

- (29) It should be noted the state has been very aggressive during the last several years in establishing new economic development legislation which have addressed a number of issues brought up in this paper. However, the recent road improvement program has also been tagged as an economic development project, yet this author has yet to see any components of the roads program which addresses the many other locational issues facing communities in southeast Kansas.
- (30) KDED, Kansas Infrastructure, 41,54,12. Information for the graphics was also obtained from the original survey computer printouts. Most of the national studies have all cited maintenance as a problem, see Congressional Budget Office. New Directions for the Nation's Public Works. Washington, D.C.: Government Printing Office, (September 1988), 101.
- (31) The National Council On Public Works Improvements Final Report, Fragile Foundations, 120.
- (32) November 29, 1988 telephone conversations with Dean Landman, Systems Plan Engineer, Division of Planning and Development, KDOT and Carl Muldner, Bureau of Water Protection, Kansas Department of Health and Environment.
- (33) KDED, Kansas Infrastructure, 35.
- (34) Ibid., iii and the "Fragile Foundations" report also found public water systems to be in relatively good shape giving them a grade of B- pp. 157-162.
- (35) KDED, Kansas Infrastructure, 36, 42. This and water quality control problems are being addressed in part through the Kansas Water Plan. Water assurance districts (first in the country) are being formed to regulate the river flow through the use of water stored in federal dams.

- (36) Ibid., 37. Excess capacity can, in some instances, be seen as a poor investment of funds if growth never occurs.
- (37) Ibid., 38.
- (38) Ibid., 39. Notice the more recently constructed RWD's also have substantial problems with leakage. Age by itself is not always a good indicator.
- (39) Ibid., 51.
- (40) Ibid., 53.
- (41) Ibid
- (42) Ibid., 54.
- (43) Kansas Department of Transportation. "Report of Highway Needs." 1988, 1.
- (44) Ibid.
- (45) Ibid., 21. See also KDED, Kansas Infrastructure, 8. The issue of standards is an important one because as standards change, so do needs. The American Association of State Highway and Transportation Officials (AASHTO), among others, have already re-evaluated several standards which have reduced the need for some improvements. Newer standards are being introduced which, to some extent, take into account the economics of different requirements.
- (46) KDED, Kansas Infrastructure, 8-9.
- (47) Kansas Department of Transportation. "Report of Highway Needs." 1988, 15.
- (48) Ibid., 22.
- (49) KDED, Kansas Infrastructure, 19. Due to changing standards, and road conditions these estimates should only be utilized to understand the magnitude of the problems.
- (50) Ibid., 12.

- (51) Ibid., 23-27. There are tens of thousands of small culverts throughout the state. Survey results indicated 35% of those culverts need major rehabilitation or replacement.
- (52) Ibid., 24. See also Department of Transportation: Office of Engineering Bridge Division. "Eighth Annual Report to Congress: Highway Bridge Replacement and Rehabilitation Program." 1987, tables 4(A) and 4(B).
- (53) Ibid., 27. Over 90% are posted for 15 tons or lighter and approximately 60% are posted for 10 tons or lighter.
- (54) Numerous circumstances contribute to deterioration including volume of traffic, weight of traffic, maintenance practices (e.g. KDOT and city maintained bridges are salted in the winter for de-icing which accelerates deterioration).
- (55) KDED, Kansas Infrastructure, 25.
- (56) Ibid., 27. The NBIP data is now almost five years old.
- (57) Ibid., 28.
- (58) "Highways for Kansas", Kansas City Star, July 10, 1987, A-12. and "Road Plan Faces Tough Test From Lawmakers", The Lenexa Sun, September 5, 1987, 1-2.
- (59) "Hayden Will Unveil New Kansas Road Plan", Kansas City Star, November 26, 1988, c-3.
- (60) Due to the complexity of the subject, these components would ultimately be determined by the task force.
- (61) As was mentioned previously, private sector systems are important, but the state has a much greater investment and responsibility for governmental systems.
- (62) Because the subject is so broad, no doubt some of the recommendations may entail additional studies.
- (63) By this I mean that even though 75% of the population lives in urban areas, major portions of the state's infrastructure lies in rural areas. There

needs to be a balance of views. Of course this also brings up the larger subject of who should pay for component systems, since urban systems are often times cheaper to construct and operate due to efficiencies's of scale associated with greater population densities.

- (64) It may be advantageous to keep the task force together on an ongoing basis, to monitor various components, to recommend new policies, and to assist with educational and promotional activities.
- (65) The task force would ultimately recommend where the office should be located. One recommendation would be to tie it into a state capital budgeting process (Perhaps even creating a seperate agency).
- (66) As was mentioned previously, many of the reports were commissioned by the National Council on Public Works Improvements.
- (67) For a more detailed analysis of research needs see Neil S. Grigg, "Research Needs for Infrastructure Management." Journal of Urban Planning and Development, Vol. 111 No. 1, Nov. 1985, 49-65.
- (68) The National Council On Public Works Improvements Final Report, Fragile Foundations, 126.
- (69) Ibid., 123-125. see also, Baadsgaard, Marinus and Pai Punda. "Sewer Line Rehabilitation Without Excavation." Public Works, September 1988, 93. Kelly. Costigan, "A Little Long-Delayed Maintenance." Forbes 135 (April 22, 1985): 124-128. Joseph F. Dunphy, , Tom Ichniowski and Anne Watzman. "Chemicals Shore Up the U.S. Infrastructure." Chemical Week 136, (March 6, 1985); 30-35. Alan Hartenstein, "Computer System Controls All Maintenance Activities." Public Works. January 1988, 60. Theodore Hopwood II, P.E. "Acoustic Emission Inspection of Steel Bridges." Public Works. May 1988, 66. Costis Toregas. "High Tech, High Touch." American City and County. April 1988, 66.
- (70) U.S. Department of Commerce. Statistical Abstract of the United States. 108 ed, Washington, D.C.: Government Printing Office, 1988, 560.

(71) Jennifer Greer, "Kansas Economic Research Urged", Kansas City Star, October 4, 1988, 4(B). The National Council on Public Works as well as several other reports noted concerns with the lack of research. Several professional groups, such as the American Water Works Association have had ongoing research programs. The most recent program is the \$150 million, 5-year strategic highway research program for roads and bridges.

(72) Of course any program should have to be coordinated with other government or private sector research programs. The private sector should be encouraged to join in the research. The university system would benefit from such a program as well. Funding sources, could be varied, but user fees could fund a substantial portion of the program.

(73) Congressional Budget Office. New Directions for the Nation's Public Works. Washington, September 1988, xv.

(74) The National Council On Public Works Improvements Final Report, Fragile Foundations, 121.

(75) Ibid., 21.

(76) Edward H. Flentje. Kansas Policy Choices, 1986, 132. It was noted that the State Highway System might be longer than needed, because the state stayed out of road construction (and planning), during the early period of highway construction. If the roads were planned with a state instead of local perspective in mind, fewer miles might have been constructed.

(77) The issue of excessive design standards was brought out in the initial reports in the early 1980's. Indeed the issue has generated substantial discussion and debate and some design standards have been modified (e.g. AASHTO).

(78) Building, Zoning, and Life Safety Codes, as well as many other federal (Davis-Bacon) and state statutory requirements can add substantial costs.

(79) One of the research considerations is to create better working models for system operators to per-

form worthwhile cost benefit analysis. Infrastructure related decisions often times have many unforeseen impacts.

- (80) Several reports and articles noted the education problem, particularly those at the local level of government. For example see; William Thornton, and Donald Ulrich. "Infrastructure Needs Analysis Limits Reactive Management." American City and County, May 1987, 38.
- (81) KDOT, KDHE, and other professional organizations do undertake limited training programs at this time.
- (82) A substantial education program is envisioned with the infrastructure office performing the needed tasks.
- (83) The National Council On Public Works Improvements Final Report, Fragile Foundations, 2.
- (84) Ibid., 84.
- (85) Thelma Helyar, Editor, "Kansas Statistical Abstract, 1986-87", 224.
- (86) This brief review of the many finance issues is not meant to trivialize the subject. Many reports have been written which have concentrated on just small specific components of the infrastructure finance issue. This is perhaps one of the most important issues that the task force should study in detail.
- (87) Edward H. Flentje. Kansas Policy Choices, 1986, 137.

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KANSAS INFRASTRUCTURE: STRATEGY FOR FORMULATING
A COMPREHENSIVE "STATE" POLICY

by

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AN ABSTRACT OF A MASTER'S REPORT

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MASTER OF REGIONAL AND COMMUNITY PLANNING

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ABSTRACT

The term "infrastructure" has been used to refer to a wide range of public and private facilities that are the physical foundation on which our society and economy rest. These facilities, which can include; roads and bridges, water and wastewater systems, public buildings, airports, solid waste systems, railroads, storm drainage systems, dams, electric, gas, and communication utilities, etc., represent a substantial financial investment, which support the state's economy and protect the health, safety and welfare of all Kansans.

Kansas is one of the leading states in providing the greatest number of facilities (miles of road, number of bridges, number of dams, miles of railroad track, etc.), for major infrastructure component systems. However, analysis of a number of these component systems indicates that serious problems do exist. Deferred maintenance, improperly designed facilities and inadequate financing appear to be just a few of the many legitimate problems facing those component systems studied. The failure to adequately address these problems could be costing taxpayers millions of dollars and may be negatively affecting the state's economy.

It has been almost a decade since concerns with the nation's inadequate infrastructure were again brought to

the public's attention. Yet state government officials have responded with only piecemeal approaches to understanding existing and potential future problems. Legislation introduced during this period of time has also tended to be piecemeal in nature, with action on specific problems (usually financing) applied towards specific components versus systems of components.

The establishment of an interdisciplinary "State Infrastructure Task Force" whose membership would be jointly approved by both the Governor and legislature is one means to review the subject and formulate policies in a comprehensive fashion. The diverse backgrounds of the task force members will be beneficial in making politically acceptable recommendations which are effective in the real world.

If a task force approach is utilized, the formation of a state infrastructure office would be necessary to assist in research and policy formulation tasks. The office could initially be located within the Department of Administration or even the Governor's office with its final location being determined by the task force.

In order to adequately derive state policies, the state infrastructure office staff and task force members should research numerous infrastructure related issues including; why existing facilities are not be properly maintained; the lack of research for new products and

construction/maintenance techniques; the need to continually review design standards and other government regulations to ensure their appropriateness with regards to costs incurred and benefits derived; the need to provide improved management/operator training and maximize public awareness through increased educational programs, the need to review the many financing issues including; user fees, innovative financing mechanisms (new forms of debt financing, impact fees, etc.), capital budgeting, and the role of state assistance programs, etc.

Researching these issues thoroughly is important because solutions to the state's infrastructure problems may often times be multifaceted and interrelated. Spending more money for construction and maintenance may appear to be a solution, but the question should be, on what specific programs should the funds be spent? For example, the root causes of deferred maintenance may be not only a lack of proper financing (and financing mechanisms) but; inadequately trained management, regulations (legal requirements which skew the proper investment decision, improper education of the general public, lack of new technologies, etc. By addressing these many smaller issues (technological, educational, etc.) which affect the state's infrastructure component systems, a much bigger return on the investment dollar may be realized. In addition, the task force's recom-

mended programs of action must distinguish between state owned and operated facilities and local government facilities as well as satisfactorily address the urban versus rural needs of the state?

Whether the task force, inter-agency committee or consultant approach is utilized, ultimately a thorough review of the previous issues must be completed and an analysis of public policy options and recommended strategies for action must be presented to the Governor and legislature.